BTEC Assignment Brief

Qualification	Pearson BTEC International Level 3 Subsidiary Diploma in Applied Science Pearson BTEC International Level 3 Foundation Diploma in Applied Science Pearson BTEC International Level 3 Diploma in Applied Science Pearson BTEC International Level 3 Diploma in Environmental Science Pearson BTEC International Level 3 Extended Diploma in Applied Science Pearson BTEC International Level 3 Extended Diploma in Environmental Science
Unit number and title	**Unit 17: Electrical Circuits and their Applications**
Learning aim	**D:** Examine the uses of transducers, sensors and other measurement devices.
Assignment title	**Transducers and Sensors**
Assessor	
Issue date	
Hand in deadline	

Vocational Scenario or Context	You are a trainee laboratory technician working for a telecommunication company who specialise in communication infrastructure. You have been tasked to put together a report to help the sales team understand some of the key components used.

Task	Carry out research into the common uses of transducers, sensors and other measuring devices. Investigate their construction and operation through laboratory practical work.
	Produce a report on the applications and operation of components and devices that contains the following sections:
	
	<u>Section 1 – Transducers, sensors and measuring devices</u>
	
	• **Describe**, using practical circuit investigations and a range of measurement devices (e.g. oscilloscope, multi-meters, data logger), the principles of operation of the following types of transducers:
	  o Passive (sensors) – Light Dependent Resistor (LDR), thermistor, reed switch and strain gauge using a Wheatstone bridge and potential divider arrangement
	  o Active – Thermocouple (you will need to demonstrate a suitable method of calibrating the thermocouple)
	• **Evaluate** the suitability of the measuring devices used in your circuits. Comparing an analogue and a digital measuring device for a given use.

	• **Describe** in detail the construction and principles of operation of a piezoelectric device and **explain** the need for amplification of the signal from the device. • **Evaluate** the effectiveness of your thermocouple for a named application. You should include a variety of industrial thermocouples, the classification of each thermocouple with technical specifications of temperature range, potential difference, current and resistance. • **Suggest** a suitable use for your thermocouple and how it would operate in your example. <u>Section 2 – Sensing and Measuring</u> • **Construct** suitable circuits and record your findings to illustrate the operational principles of the following sensors: - pH meter, moisture sensor, pressure sensor and light sensor • **Evaluate** the suitability of each sensor tested in terms of their practical applications, providing useful examples in the real world You should include photographs or video footage of all your practical demonstrations as additional evidence.
Checklist of evidence required	A report that contains explanatory notes, circuit diagrams, and video or photographic evidence of practical work covering: • The uses and basic operational principles of a range of active and passive transducers, sensors and other measuring devices listed in the tasks • A demonstration and evaluation of the principles of use of a suitable thermocouple for a named application. Include accompanying circuit diagrams and technical data to support the choice of a specific type of thermocouple for this use • Report on sensors and measuring devices **Learner practical work / results needs to be verified by teacher**

Criteria covered by this task:	
Unit/Criteria reference	To achieve the criteria, you must show that you are able to:
D.D3	Evaluate the use of transducers, sensors and measurement devices in practical situations in terms of their fitness for purpose
D.M5	Demonstrate the correct basic principles and uses of transducers, sensors and electrical measurement devices in practical situations
D.P5	Describe the basic principles of operation of transducers, sensors and electrical measurement devices

Sources of information to support you with this Assignment	http://www.calpoly.edu/~gthorncr/ME236/documents/Exp2.pdf http://www.globalspec.com/learnmore/optics_optical_components/optoelectronics/lux_meters_light_meters Centres are encouraged to include local employers in delivery by asking them to give guest lectures and provide opportunities for industrial visits and work experience.